

IN THE CLAIMS:

Claims 1-111 (Currently Cancelled)

112. (New) Apparatus for providing ventilatory assistance to a patient comprising a control mechanism for deriving two error signals each of which is a function of the same target value and a respective one of two patient ventilation measures, the two patient ventilation measures having respective relatively fast and relatively slow speeds of response, said control mechanism further deriving two control responses to respective ones of said two error signals and combining said two control responses to produce an overall control response that increasingly favors the control response to the error signal that is a function of the ventilation measure with the faster speed of response over the control response to the error signal that is a function of the ventilation measure with the slower speed of response as the ventilation measure with the faster speed of response becomes increasingly less than said target value; and a ventilator responsive to said overall control response for controlling the pressure of air delivered to said patient.

113. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 112 wherein each of said two control responses is a function of the amplitude and sign of the respective one of said error signals so that the control response to the error signal that is a function of the ventilation measure with the faster speed of response is more vigorous than the control response to the error signal that is a function of the ventilation measure with the slower speed of response.

114. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 113 wherein the degree of control exercised by said

ventilator increases with the magnitudes of said two error signals.

115. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 114 wherein for equal error signals below and above said target value, the degree of control exercised by said ventilator is greater for error signals below said target value.

116. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 115 wherein said target value is an alveolar ventilation that takes into account the patient's anatomical or physiologic dead space.

117. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 116 wherein said control mechanism further determines the phase of the current breathing cycle and adjusts said overall control response to be a function of the amplitude at the determined phase of the current breathing cycle of an amplitude-versus-phase template that is appropriate for a normal breathing cycle.

118. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 117 wherein said control mechanism determines the phase of the current breathing cycle by relating respiratory airflow and its rate of change to different phases of a normal breathing cycle.

119. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 118 wherein said control mechanism determines the phase of the current breathing cycle by applying a set of fuzzy logic rules.

120. (New) Apparatus for providing ventilatory assistance to a patient in

accordance with claim 119 wherein said overall control response is a clipped integral of a function of both of said error signals.

121. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 112 wherein the degree of control exercised by said ventilator increases with the magnitudes of said two error signals.

122. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 121 wherein for equal error signals below and above said target value, the degree of control exercised by said ventilator is greater for error signals below said target value.

123. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 122 wherein said target value is an alveolar ventilation that takes into account the patient's physiologic dead space.

124. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 112 wherein said target value is an alveolar ventilation that takes into account the patient's physiologic dead space.

125. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 112 wherein said control mechanism further determines the phase of the current breathing cycle and adjusts said overall control response to be a function of the amplitude at the determined phase of the current breathing cycle of an amplitude-versus-phase template that is appropriate for a normal breathing cycle.

126. (New) Apparatus for providing ventilatory assistance to a patient in

accordance with claim 125 wherein said control mechanism determines the phase of the current breathing cycle by relating respiratory airflow and its rate of change to different phases of a normal breathing cycle.

127. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 126 wherein said control mechanism determines the phase of the current breathing cycle by applying a set of fuzzy logic rules.

128. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 112 wherein each of said error signals is a clipped integral of the respective patient ventilation measure minus said target value.

129. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 112 wherein said ventilator includes a servo control mechanism whose gain is adjusted in accordance with the magnitudes of said error signals.

130. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 129 wherein said gain increases with the magnitudes of said error signals.

131. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 130 wherein for equal error signals below and above said target value, said gain is greater for error signals below said target value.

132. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 130 wherein said gain is varied more aggressively for conditions of hypoventilation than for conditions of hyperventilation.

133. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 112 wherein said ventilator is flow-triggered and phase cycled.

134. (New) Apparatus for providing ventilatory assistance to a patient in accordance with claim 112 wherein said ventilator withdraws ventilation support more gradually when the patient is over-ventilated than when the patient is under-ventilated.